Claims

What is claimed is:

[c1] A method for improving branch prediction rates in a microprocessor comprising:
processing a case;
determining a next case from a sequence involving the processed case; and
processing the next case.

[c2] The method of claim 1, further comprising:
selectively processing the next case based on an associated probability.

[c3] The method of claim 1, wherein determining the next case and processing the next case occur during the processing of the case.

[c4] The method of claim 1, further comprising:
determining the sequence from profile information.

[c5] The method of claim 1, further comprising:
determining a second next case from the sequence; and
processing the second next case.

[c6] The method of claim 5, wherein processing the second next case is selective based on an associated probability.

[c7] The method of claim 5, wherein determining the second next case and processing the second next case occur during the processing of the case.

[c8] The method of claim 1, wherein the case and the next case are branch instructions.

[c9] A method of improving a prediction rate for instructions in code comprising:
determining a sequence from profile information; and
transforming the code based on the determined sequence.

[c10] The method of claim 9 wherein transforming the code comprises:
adding a follow-set to a portion of the code for processing a first instruction in the sequence.

[c11] The method of claim 10, wherein adding the follow-set is selective based on a probability associated with the sequence.

[c12] An apparatus for improving branch prediction rates in a microprocessor comprising:
a compiler comprising an optimization component,
wherein the optimization component determines a sequence from profile information and transforms code received by the compiler based on the determined sequence.

[c13] The apparatus of claim 12, wherein the optimization component adds a follow-set to a portion of the code.

[c14] A software tool for improving branch prediction rates in a microprocessor comprising:
a program stored on computer-readable media for
processing a case;
determining a next case from a sequence involving the processed case; and
processing the next case.

[c15] The software tool of claim 14, further comprising:
a program stored on computer-readable media for
selectively processing the next case based on an associated probability.

[c16] The software tool of claim 15, wherein determining the next case and processing the next case occur during the processing of the case.

[c17] The software tool of claim 16, further comprising:
a program stored on computer-readable media for
determining the sequence from profile information.

[c18] The software tool of claim 14, further comprising:
a program stored on computer-readable media for
determining a second next case from the sequence; and
processing the second next case.

[c19] The software tool of claim 18, further comprising:
a program stored on computer-readable media for
selectively processing the second next case based on an associated probability.

[c20] The software tool of claim 18, wherein determining the second next case and processing the second next case occur during the processing of the case.

[c21] The software tool of claim 14, wherein the case and the next case are branch instructions.

[c22] A software tool for improving a prediction rate for instructions in code comprising:

a program stored on computer-readable media for

determining a sequence from profile information; and

transforming the code based on the determined sequence.

[c23] The software tool of claim 22, wherein transforming the code comprises:

a program stored on computer-readable media for

adding a follow-set to a portion of the code for processing a first instruction in the sequence.

[c24] The software tool of claim 22, wherein adding the follow-set is selective based on a probability associated with the sequence.

[c25] An apparatus for improving branch prediction rates in a microprocessor comprising:

means for determining a sequence; and

means for transforming code based on the sequence.

[c26] The apparatus of claim 25, further comprising:

means for adding a follow-set to a portion of the code.

[c27] A method of improving branch prediction rates in a microprocessor comprising:

converting a plurality of unpredictable branches into a set of predictable branches by expanding at least one of the unpredictable branches into a follow-set branch based on a profile for the unpredictable branches.

[c28] A method for improving branch prediction rates in a microprocessor comprising:
determining a sequence involving a branch from profile information;
processing the branch;
determining a next branch in the sequence; and
selectively processing the next branch during the processing of the branch based on an associated probability.

[c29] The method of claim 28, further comprising:
determining second next branch in the sequence; and
selectively processing the second next branch during the processing of the branch based on an associated probability.

[c30] The method of claim 28, wherein the processing is based on code transformed to comprise a follow-set for the sequence.

[c31] A method of improving processor performance comprising:
transforming a set of branches into a second set of branches,
wherein the second set of branches comprises
the original set of branches; and
a sequence of branches likely to execute as an entity.

[c32] A processor comprising:
means for processing instructions; and
means for transforming a set of branches into a second set of branches,
wherein the second set of branches comprises
the original set of branches; and
a sequence of branches likely to execute as an entity.